

# AUTHORS' RESPONSE (MARCH 5, 2019) TO THE LETTER TO THE EDITOR CONCERNING THE PAPER “IMPACT OF AIR POLLUTION ON DEPRESSION AND SUICIDE”

Dear Editor,

In the letter [1] concerning the authors' review [2], a very important issue has been brought up. Air pollution and climate change are both associated with mental health problems, and this relationship requires profound investigation.

Global warming causes thousands of deaths each year [3]. In terms of the central nervous system, increased temperature can cause excessive free-radical production, blood-brain barrier permeability and glutamate release [4], which are all associated with depression, anxiety disorders and dementia, among others [5]. Moreover, climate change causes a rise in weather disasters [6] that can trigger post-traumatic stress disorder, alongside depression, substance abuse and suicides [7]. Furthermore, prolonged droughts, floods and other natural disasters are associated with migrations across the world [8]. As it was shown, people forced to migrate are more prone to suffer from mental illnesses [9].

In their article, the authors reported that depression and suicide rates are associated with certain air pollutants [2]. However, their levels depend on ambient temperatures. In 2 studies, it was revealed that air pollution is influenced by relative humidity and annual temperature [10], especially in terms of  $\text{NO}_2$ ,  $\text{O}_3$  and  $\text{SO}_4^{2-}$  concentrations [11].

Heat may also elevate the density of airborne particles [12]. Consequently, increased temperature may lead to more frequent respiration, which can cause additional toxicant absorption [13].

In light of these facts, it can be partially explained why mental illness and suicide rates are higher during the periods of increased temperature [14], after extreme weather events [15], as well as during heavy air pollution [2]. However, the authors of the article agree with the authors of the letter that the impact global warming and air pollution on mental health has not been fully defined yet. Further epidemiological studies based on population data and considering these 2 factors are essential in widening the current knowledge on this relationship.

#### Key words:

**air pollution, climate change, global warming, suicide, depression, particulate matter**

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